



Kevin Weber stands beside the wreckage of his government vehicle. (Photo courtesy of Tulsa District)

## Tulsa District civil engineer survives Oklahoma tornado

By Judy Marsicano  
Fort Worth District

Kevin Weber made a last-minute decision that saved his life recently when he faced the killer tornado that tore through Oklahoma City.

Weber is a civil engineer in Tulsa District's Engineering and Construction Division. On May 3, he departed Tulsa, Okla., in a government vehicle for Lawton, Okla., to attend a scope-of-work meeting on a containerization project at Fort Sill, Okla.

"It was about 7 p.m. when I reached Oklahoma City, and it started clouding up and looking really nasty, so I turned on the radio and heard the tornado warnings," Weber said. "I saw this big black cloud but, since the sky looked clear to the south, I stayed on the road and angled southwest toward Chickasha."

As Weber drove, he saw a massive black cloud moving toward him, so he pulled over at an overpass behind two other parked cars.

"I must have sat in the car for a good four or five minutes, just watching to see what the storm was going to do," Weber said. "There was a calmness and it wasn't raining very much. Then, the strangest thing happened. As the tornado moved in my direction, stuff just started defying gravity, slowly levitating up from the ground in front of it, and I thought to myself, 'Boy, this isn't right!'"

With the tornado heading directly for him, Weber felt the car shake, so he turned off the ignition, got out, and stuck the keys in his pocket. He quickly sought shelter under the overpass where four or five others were already bracing themselves to ride out the storm.

"I made my way up the concrete backslope as far as I could, looking for something heavy to hold on to," Weber said. "I closed my eyes and held my head down to try to protect my face."

Holding on to an I-beam with his right elbow wedged against the flange of the beam and the rest of his body dangling free, he compared what happened next to a violent roller coaster ride while being pelted with flying debris.

"No sooner had I gotten my grip than someone yelled, 'It's right on top of us!'," Weber said. "A lot goes through your mind. I thought of my family; I said a prayer, and had thoughts about the afterlife. I was trying to think about what was going to happen next and I remember thinking this could be it for me. My last meal had been a quarter-pounder and french fries. Then I heard a boy ask his mother, 'Are we going to die?' I heard her answer, 'No, we're not going to die.'"

"I felt something hard hit me in the head," Weber said. "I raised my head to try to see what was happening and saw this piece of lumber suspended in the air right in front of me. Mud and debris were everywhere. At one point, I don't know why, but I looked down at my watch to see what time it was. I had to wipe the mud from the face. My whole arm was covered with mud and I couldn't even see the concrete in front of me, so I closed my eyes and put my head back down when something hit my leg, hard. I don't know what it was, but it gashed my leg and I knew by the pain that my leg was broken."

At that point, Weber almost lost his grip. For about 30 or 40 seconds, the wind battered him with

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## System links expertise to units in field

By Marnah Woken  
Europe District

The U.S. Army Corps of Engineers is providing engineering support to NATO operations in the Balkans through TeleEngineering. Developed by the Engineering Research and Development Center at the Waterways Experiment Station (WES), TeleEngineering provides efficient real-time engineering support from technical experts anywhere in the U.S. Army Corps of Engineers.

Through a network of secure high-frequency satellite communications systems, TeleEngineering allows engineers to collect data in the Balkans and participate in real-time video consultations which tap into the Corps' broad range of expertise.

Erich Schuette, an information management specialist in Europe District, deployed in April to assist with the initial setup of TeleEngineering equipment at the Task Force Operations Center in Albania.

**Portable door to Corps.** "TeleEngineering is a portable door to the Corps," said Schuette. "Once everything is hooked up, it's as easy as making a phone call. For example, we were asked to take a look at a building in Albania to see if it was structurally sound. We videotaped the building and transmitted the video back to Europe District's Emergency Operations Center through our secure satellite communications link. At that point, Corps structural engineers in Europe District waiting to deploy to Albania viewed the video. Through video teleconferencing, they made their calculations and recommendations."

"We were also asked to make recommendations on improving a guard tower in Albania," said Schuette. "They took video of the structure and sent it to us via our satellite link. At that point, Force Protection Specialist Ed Conrath from Omaha District used his previous experience in Bosnia to make recommendations to improve the structure."

Lt. Col. Larry McCallister, commander of Europe District's Contract Construction Agent Team 1, is forward deployed to Albania and works with TeleEngineering regularly.

"The biggest benefit to TeleEngineering is the



Enhance  
Capabilities

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Chaplain's Column

# Faith is a powerful 'force multiplier'

By Lt. Col. (Chaplain) Tim Carlson  
Headquarters

It always amazes me how one can find spiritual lessons in military language. About 10 years ago, I went through the Combined Arms Study Staff School and Command and General Staff College. Since that was the Cold War era, we discussed the Fulda Gap, the region of Germany where the then-Soviet army would probably strike if World War III ever started.

One constant was the ratio of soldiers -- three Soviet soldiers against each American. Force multipliers were critical if we were to halt an attack and win. We gave numerical weights to the technological elements of our arsenal, ranking our tanks against theirs, our aircraft against theirs, and so on.

But even after this detailed statistical drill, there was still a question about our winning. I believe that we always had that doubt because our calculations failed to take one critical element into account.

Multiplying our force remains a genuine concern of leadership in the U.S. Army, including the Corps of Engineers. Without a doubt, computers and scientific advances have moved our abilities forward in quantum leaps. We continue to do more and more with fewer and fewer people. But there still can be one critical factor missing. The need for force multipliers, and that missing factor, is as old as warfare.

Centuries ago, a giant named Goliath, backed by the army of Philistia, threatened the army of Israel. By the standards of any age, Goliath was a formidable foe. He stood about 10 feet tall, fully armored

from head to foot, and armed with a giant-sized spear and sword. Each day for 40 days, Goliath stood on a hill across from the Israelite army, challenging them to send someone to meet him in single combat.

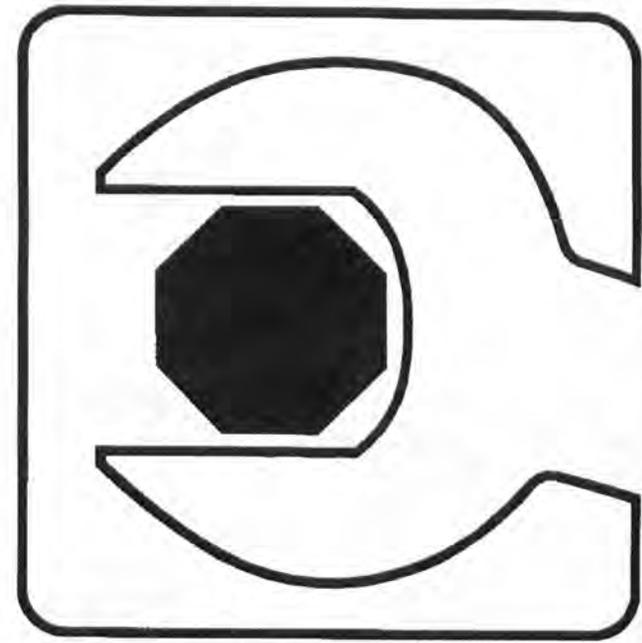
No one dared until a young man named David, a shepherd hardly of soldierly age, came to visit his older brothers who were serving in the army. David heard Goliath shouting taunts, and was shocked that no one in the army of Israel had the courage to meet the giant's challenge. So David asked King Saul for permission to fight this formidable threat.

Risk assessment would give Goliath a hundred-to-one odds of winning, maybe more. Why would David offer himself up to certain death? Was it because he had a force multiplier — *his slingshot?*

The ancient sling was nothing more than two leather cords about the length of the slinger's arm, connected to a leather pocket. The slinger placed a rock in the pocket, whirled it around his head by the cords, then released one cord to send the stone flying. It could throw a rock with lethal force.

David knew the power of his sling. With it, he had already killed predators that had attacked his sheep. But David had another force multiplier, the critical missing factor that I mentioned earlier. He had *faith*...a firm, unshakeable belief that God makes the supreme difference in the affairs of mankind.

Faith isn't easy for pragmatic thinkers to accept. It was tough for Saul, and viewed as absolute folly by David's older brothers. But you probably remember how the story goes. Young David went out to duel the behemoth armed with only his sling and five smooth



stones. (Another force multiplier, for David knew that a smooth stone flies straighter and faster than a rough one.) After exchanging words (some cursing by Goliath and some expressions of faith by David), they moved in for combat. The young shepherd unleashed a stone, striking the huge man on his forehead and knocking him out. David took the giant's sword and slew him. This act of bravery and faith gave new courage to the Israelite army. They attacked the army of Philistia and routed them.

Is all this merely *outdated religious bunk* or a *waste of my time?* These may well be reasoned responses to the idea of faith as a force multiplier. But I suggest that the greatest force multiplier ever known to the world is faith. We must have faith that the Corps' leaders know what they are doing, and faith that they will act with the best motives.

Without faith, we would never have the courage to make *any* progress. Just like the Israelite army, we could not make the first move because of our fears of the "Philistines" and their contemporary "Goliaths."

Before we jettison faith as a vestige of yesteryear, I suggest we *employ* it. I propose we open our minds and hearts to this great gift. David tried faith and it worked. I challenge us to try it as well!

## Tornado

Continued from page one

incredible force, pulling his legs up and pounding him against the beam. After what seemed like minutes later, Weber said the wind began to slow and he watched the black cloud as it moved away, just like in the movies.

"Then, I heard a lady say, 'It's coming back,'" Weber said. "But it didn't."

Reeling from the incredible experience, each person slowly descended the steep slope. Someone used a piece of lumber and a branch to make Weber a makeshift splint. A news crew chasing the tornado pulled over to help the survivors. All were covered with mud and the grass that once surrounded the overpass was stripped from the ground. Dazed, Weber looked for his vehicle, but it wasn't where he left it.

"Then that little boy came up behind me and I heard him ask, 'Where is my mom?'" Weber said. He learned from the newspaper the next day that the

woman had given her life when she rushed her 11-year-old son to shelter under the overpass. She had told him to close his eyes and she had held his hand as she covered his body with hers so he wouldn't blow away. Then the tornado got her instead, snatching her away from her son's hand.

The doctor in the hospital emer-

gency room told Weber that his back looked as though it had been sandblasted and had someone take a weedwacker to it.

"While I was lying there, the doctor grabbed a pair of scissors and came over to look at my leg," Weber said. "I had cowboy boots on and he asked me if he could cut my boots off. I thought

to myself, 'Where but Oklahoma would they ask permission to cut your boots off!'"

Days after the tornado, emergency workers found Weber's government car a mile away, a twisted mass of metal. A minister found his government ID card, plans and specifications, the scope of work, and some CEFMS paperwork in Newcastle, Okla., four miles away.

Currently recuperating at home with a broken leg and severe bruising on his legs and lower back, a shaken Weber is refocusing on his life and his family.

"After what I've been through and from what I've seen on television, I can't imagine why more people weren't killed," he said. "It goes to show you how much the human body can stand. I've lived through it and I've accepted it, but the reality of it all is how quickly a life can be taken."



The same tornado that injured Kevin Weber also devastated the Oklahoma City area. (Photo courtesy of Tulsa District)



## Commentary

# Support needed to make tough calls

By Becki Dobyns  
Headquarters

Supervisors in the Corps are scared. They're afraid of lawsuits and grievances. They're afraid of doing things differently and, mostly, they're afraid of taking tough actions. The fear, sustained over time, translates into inertia and dysfunction.

All too often, supervisors don't do the right thing; they do the *safe* thing and later *convince* themselves it was the right thing. Look at just two examples — firing and giving awards.

Say you've been goofing off on the job. Want to keep goofing off yet avoid getting fired? You know what to do — just file a grievance! That'll get 'em running scared and then you can relax. Play a little solitaire. Surf the 'net.

Frequently, that's how it works. The slackers submerge into apathy and the workhorses shoulder a heavier load. A lopsided work situation limps along even more visibly. Teamwork falters. Stress, resentment and cynicism mount.

The grievance system itself is not to blame. Most of the time, it works as intended. But supervisors' fear of retribution hobbles and eventually cripples the organization, harming most those who contribute most.

Then there's the award system. The term "incentive award" is a joke. Incentives? In most cases, awards have become *entitlements*, merely yearly bonuses, expected and demanded despite the level of performance that supposedly generated them.

Some supervisors seem to have forgotten the purpose of awards — to recognize (set apart, make special) outstanding work, thereby perpetuating continued strong performances. Because supervisors are afraid of grievances, everyone in an office or a team gets the *same* award. Equal recognition for unequal work. Then they rationalize their actions in the name of fairness and maintaining workplace equilibrium. But giving everyone the same award

is neither fair nor harmonious.

Those who contribute least see that their level of work doesn't matter. They're still getting an award, so why work harder? Those who contribute most see the futility in excelling since their work isn't seen as any more special than the laziest or least competent co-worker. That's not a reward! And it certainly isn't an incentive. It's a *disincentive*.

Sorry, but sometimes being fair means treating people differently. A guest speaker at the Senior Leaders Conference several years ago said, "If you want to lead sheep, be a shepherd! But don't manage people because they're not all alike."

Our pay scale system couldn't work like that. GS-14s get paid more than GS-7s because their level of work is different and they (allegedly) offer greater value to the organization. So they don't get paid the same; they get paid more because their work has higher value. What would happen if you tried paying everyone the same salary? *Chaos* — not harmony. Would you be regarded as fair? Hardly!

I got to thinking about supervisory fear while listening to a retirement speech by Col. Robert Fernandez, former Chief of the Commander's Planning Group in Headquarters. He urged those continuing with their Corps careers to do the right thing simply because it's the right thing to do. My hope is like his — that our ethics are stronger than convenience or comfort.

One of the seven Army values is personal courage. We don't see it much in practice. That's because what is called for is *more* than courage.

What is called for is an organization that supports supervisors making the tough decisions just as much

as it supports those filing complaints.

I have heard Lt. Gen. Joe Ballard, Chief of Engineers, and Maj. Gen. Albert Genetti, retired Deputy Chief of Engineers, both rail against award abuses. They're right. But we must take a step back and look at the big picture. It's easy to lecture people sternly and tell them to run a tighter ship. It's also easy to limit the funds available for awards. But award abuse

is the symptom, not the ailment. If our leaders really want to fix the problem, they've got to support courageous decisions with more than rhetoric.

Yes, it is right and proper to hold ourselves, and others, to high standards. It is right and proper to do the right thing simply because it's the right thing to do. Ultimately, we have to live with the decisions we make and thus we must live our lives accordingly.

Living ethically, living the Army values, won't be easy. But support from the top would mean we weren't making the tough calls alone.

Support for courage would invest in people on many fronts. It would mean better hiring as well as firing. It would improve our business processes by encouraging innovation and risk taking. We wouldn't be the same stodgy, overly-conservative, do-it-the-same-way-we-did-it-last-time organization. The U.S. Army Corps of Engineers would be a progressive, stimulating, and truly rewarding place to work.

(If you're interested in ethics, check out [www.charactercounts.org](http://www.charactercounts.org), the web site of the Josephson Institute of Ethics, a non-profit organization dedicated to advancing ethics in business.)

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**"What is called for is an organization that supports supervisors making the tough decisions just as much as it supports those filing complaints."**

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## Commentary

# CMR-Plus implementation underway

By Cheryl Chrisman  
Louisville District

*What you see is what you get.*

This is a basic principle I have experienced time and again. I step up to the golf tee. Using my past performance indicators, I am so confident that I'll hit the ball into the lake that I reach into my bag and pull out a special ball — my water ball. I shouldn't be surprised when, just as I'd subconsciously planned, my ball lands in the lake.

Fortunately for us all, our organizational leaders understand this principle and have set forth a strategic vision (a conscious corporate picture) of a *successful* future. We are quite deliberately planning and moving toward not just surviving but *thriving* in the next millennium.

Now, consider our performance measurement system using the same principle. We travel in the direction of our strategic vision daily, but each quar-

ter we look in the rearview mirror to see how far we have traveled and count and analyze the bumps in the road.

This need not be the destiny of our organization. Through the evolution of our strategic planning process, our corporate leaders have realized that, besides measuring and accounting for what has already happened, we need to measure our capabilities across all functions to travel the road ahead. Twenty years ahead, in fact.

Did I say evolution? Maybe I should say *revolution!* A cultural change, really.

What type of performance measures are we talking about? The health of our mission, the well-being of our client/customer relationships, capabilities and innovation (human and technological), and business practice developments and improvements. That's the framework —

four critical dimensions of our business.

The Performance Measurement Focus Team re-

cently identified a dozen strategic measures that focus on the critical missing dimensions of corporate direction not addressed by the traditional Command Management Review (CMR). Operational measures will still be collected and analyzed by program managers, and assimilated for the Chief of Engineers. But they will be discussed at the executive level only when the operational performance signals a larger impact on corporate performance.

The strategic corporate measures will facilitate and focus senior executive discussions on our corporate performance targets, not just yesterday and tomorrow, but to our 2020 vision and beyond.

Where are we in implementing the CMR Plus (CMR+)? Last month, the strategic measures were refined by focus teams and other Headquarters staff. The major subordinate commands will be invited to give their input, and our ultimate goal is to present the third quarter information/data in the new CMR+ format next month.

More information about CMR+ can be found at <http://www.usace.army.mil/sbsp/cmr>.

We must never let our past performance define our future capabilities. Instead, we can use the past as a baseline to transform our future and measure how far we've come. Be sure to keep your attention focused down the road and *what you'll see is what you'll get*.

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**"The Performance Measurement Focus Team recently identified a dozen strategic measures that focus on the critical missing dimensions of corporate direction..."**

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Lori Thomas searches through debris after the tornado in Oklahoma, hoping to find and salvage personal items and return them to the storm victims. (Photo courtesy of Oklahoma District)

# Corps volunteers salvage memories

By Judy Marsicano  
Fort Worth District

Lori Thomas stooped to pick up a photo album, torn and covered with mud, and a high school diploma. Penni Walker found a child's soiled teddy bear and a catcher's mitt. Papers were blown against a fence as far as the eye could see, and remnants of blankets and clothing dangled in the trees. All were reminders of the powerful tornadoes that swept through Oklahoma May 3-4.

Thomas and Walker, both from Tulsa District, were among 92 Corps volunteers from across the country who were sent to help victims of the killer tornadoes start new lives. Assigned the grim task of removing and disposing of debris from damaged homes and businesses, they came face-to-face with the reality of what the tornado victims lost.

Residents fortunate enough to have escaped with their lives are agonizing about the loss of everything they owned, most of all about the things they cannot replace, like family heirlooms, photos and other keepsakes. But Corps employees offered some help by keeping a sharp eye for items that residents might want returned, before the items

ended up in a landfill.

"Our first order of business was to clear the debris so people could get in and out of their streets," Walker said. "But when we saw this kind of stuff ending up at the processing site, we thought there was something more we could do, so we jumped in to retrieve as many mementos as we could."

Ott Boswell, from Fort Worth District, worked alongside contractors in what was left of neighborhoods in Oklahoma City. He collected two bags full of items, including a watch (still ticking), children's drawings, a Bible, and framed photographs.

"I can't help but think that someone would want these back," Boswell said. "This might just help someone a little in recovering from this ordeal."

The most interesting thing found was a stack of historical documents dating from 1889 to 1928, varying from the minutes of an oil company's board of directors meeting in 1920 to correspondence dated 1919 about payment of interest due for 1899 Liberty bonds. The found items were turned over to several volunteer agencies that scanned photos onto the Internet and worked to return other personal effects to their owners.

# Engineer is one of top 10 in government

By David Longmire  
Vicksburg District

If there's one thing George Sills likes more than a problem, it's finding the answer. "My driving force is having a problem to solve," said Sills, a 28-year veteran of Vicksburg District. That drive led to him being named one of America's top 10 federal engineers.

Headquarters selected Sills as the Corps' nominee for the National Society of Professional Engineers' (NSPE) Federal Engineer of the Year Program. Sills is among the NSPE's 10 finalists from a field of 33 representing agencies like the Air Force, the Surgeon General's Office, and NASA.

Sills is a geotechnical specialist, a branch of civil engineering dealing with foundations or soils "whether it's flow of water through it, building on it or using it as a building material," Sills said.

On the job, the geotechnical engineer found many opportunities to demonstrate his talent. Sills worked on a variety of projects and published a number of papers. Among his accomplishments, Sills developed a method of slide stabilization using stone-filled trenches, and applied a new technique called soil nailing. It was first used on the Natchez Bluff, Miss., Stabilization Project, reducing costs by about 30 percent, saving about \$9 million.

On the Red River Waterway in Louisiana, Sills has design experience on six major locks and dams. As the independent project manager, Sills established navigation on schedule and averted a costly delay at Locks and Dams 4 and 5 on the Red River by having the cofferdams excavated early and the material used as backfill. In another Red River project on Lock and Dam No. 2, Sills developed a new method of pile

load testing that saved the contractor about \$1 million.

According to Sills' wife, Huel, he is also a man of kindness and conviction. "He's a caring person," she said. "He always says he doesn't have much of a warm, fuzzy side, but he does." A 1993 assignment in the flooded Midwest was particularly emotional. "I think that got him right in the gut. Homes were washed away with just one swish of the water. They couldn't save them all, and that really bothered him."

For his efforts, the area invited Sills back as grand marshal of Floodfest '96. Other honors include the Commanders Award for Civilian Service in 1995 and the Commanders Award for Community Service in 1997.

Despite his big-time success, Sills is grounded in his small-town roots. "Really and truthfully, I'm just an old country boy," he said. "I really am. I never lost that side of me."

Sills is currently a doctoral candidate at Louisiana State University and is almost ready to embark on a new career. "I decided I could retire after 30 years and move to a university and teach geotechnical engineering from a practical side," he said. "It's really hard to learn everything that you ought to know about this in a classroom. It's valuable to the profession to pass down 20-plus years of experience."

Until then, Sills mentors young engineers. For 10 years, he has participated in Engineer Week activities in Warren County schools. Through the Society of American Military Engineers he helps future engineers as the student post coordinator and scholarship chairman. The organization awards \$2,000 in scholarships each year to local students going into a scientific field.



George Sills, a geotechnical specialist with Vicksburg District, was one of the top 10 finalists in the Federal Engineer of the Year Program. He has been with the district 28 years. (Photo courtesy of Vicksburg District)

## Baltimore District continues helping DC schools

By Ted Henry  
Baltimore District

It's been a full year since Baltimore District signed a memorandum of agreement with the District of Columbia Public Schools System to execute its multi-million dollar capital improvement program. Emergency repairs were completed before the beginning of the school year in 1998, and significant strides have been made under this year's tasks.

Looking toward the future, prioritizing is well under way and Baltimore District and the District of Columbia are well positioned to continue with the badly needed renovations.

### A year ago

Last April, nearly every district organization focused on meeting emergency needs for the beginning of the summer STARS program and school opening on Sept. 1. Before summer ended, the Corps had replaced 33 roofs, installed four modular chillers and cooling systems, repaired 1,000 windows at one high school, and completed a variety of other minor repairs.

After the school year began, project personnel focused on replacing windows at three schools and 16 boiler systems.

"We're about 75 percent finished with the projects slated for the school year that ended in June," said Dave Morrow, project manager for the D.C. Schools project. "While contracting issues have slowed some of our specific projects, we're still working on those remaining tasks considered the highest priority. I expect the existing hurdles will be resolved soon so we can complete all our projects and focus on the next school year."

Projects slated for 1999 include window replacements at 11 additional schools and five more roofs. The district is removing about 200 underground heating oil storage tanks from 180 sites. Once the tanks are removed, the schools will be converted to natural gas.

About \$76 million was set aside for the 1998 projects, and an additional \$54 million for 1999. About three-fourths of the 1999 budget will go toward repairs for the upcoming year, while the remaining funds will support planning and design for renovating or replacing eight elementary schools and one junior high school.

### The future

"After a year of laborious but fruitful work to address emergency renovations, the project is moving into a more organized and efficient phase," said Morrow. Baltimore District has completed a needs assessment for 138 facilities and will send a draft long-range facilities master plan to the District of Columbia this fall.

"The plan will build on the approved 1999 capital improvement plan, laying out a tentative 10-year master plan for renovating eight to nine schools a year," said Morrow.

"A very positive note is that the mayor and the city council provided enough money in future budgets to conduct most of the renovations that will be outlined in the master plan," said Morrow. Thus far, about \$600 million during the next six years has been earmarked for the D.C. Schools capital improvement program.

# Corps helps Puerto Rico rebuild highway

By Christina Plunkett  
Jacksonville District

Many residents of Puerto Rico breathed a collective sigh of relief since the U.S. Army Corps of Engineers oversaw the rebuilding of a one-mile stretch of Highway 187.

Thanks to the Pinones (Highway 187) CAP Section 103 Beach Erosion Project, 600 families in Terraplain, Puerto Rico, will no longer live in constant fear of their homes being flooded. And residents and visitors to Puerto Rico, traveling from the eastern part of the island to San Juan, will no longer be periodically cut off from Highway 187, a main thoroughfare connecting San Juan to Loiza. It is also a hurricane evacuation road for the Pinones area.

For decades, the Terraplain residents and other Puerto Ricans have borne the hardships of flooding. During the high-tide season from September to March, cold fronts from the U.S. bring waves up to 15 feet high to pound the island. Where protective dunes and road elevations are low, the high waves and tidal surges push water over the highway and into low-lying areas, washing away sections of the beach, embankments, and even the roads themselves.

Because this area has a soft sand base, the waves from a strong northern storm would wash away roads, virtually cutting a new inlet across the Pinones sand spit. This happens to portions of Highway 187, which is surrounded by beach on one side and wetlands and communities on the other. That is why this shore protection project is so important.

Several times a year, when high waves hit the northern coast in the Pinones area, the congested traffic area is inundated, isolating neighborhoods, preventing school attendance, and causing further congestion with traffic re-routing.

Redondo Construction Company began the Pinones beach erosion project in August 1997, and it was completed last month. The project involved not only cre-

ating a new and wider road, but also elevating the road up to 11 feet higher than the old highway. The contractors also built an armored stone revetment, changed the slope and angle of the road's curve about mid-way, and updated all utility lines in the area.

The project was built in three segments. Segment B placed a 240-foot offshore breakwater at Punta Maldonado. Segment C created almost a mile stretch of new road, eight feet wider, along the beach and Terraplain community. In this section, contractors elevated the road 11 feet, built a new access road for the Terraplain residents, and installed a water line under the road.

To elevate the new road and provide shore protection in Segment C, contractors also built an armored revetment. The revetment, which goes as deep as five feet below sea level and as high as 11 feet above sea level, consists of three layers — geotextile fabric, 1.5 feet of bedding stones, and 4.5 feet of armored stones on top.

Segment A, awarded as an optional bid item because it was not part of the base bid, included the elevation, widening, and armoring of 477 more feet of Highway 187 west of Punta Maldonado. The contractors decreased, opened, raised, and widened a particularly treacherous curve. The contractors also built a new bike path beside the highway, funded by the Puerto Rico Highway Authority.

The high waves and storm surge of Hurricane Georges tested the new eastern reach of Highway 187 in September 1998 while it was still under construction. The road faced another high wave event last February. The road performed beautifully, according to Adair Martin, project engineer. "During these events, no damage occurred to the highway or armoring, and no flooding occurred, allowing the road to remain open," Martin said.

All of the new Highway 187 is open now and traffic is increasing daily. Corps attorney Jordan Soto uses the highway traveling from Carolina to San Juan. Soto says he used to avoid it because when it rained the road would often flood. "Now, I can use the highway and feel at ease, knowing I won't have to worry about being stranded by a sudden fierce storm," Soto said.

As the project's work ended, the Puerto Rico Highway and Transportation Authority (PRHTA) requested that the Corps oversee an additional contract to reforest the area starting last month. The Puerto Rico Planning Board Regulation requires mitigation not only for lost wetlands but also for *all* lost trees. Because of the Corps' quick response in planning and designing the Pinones project, the PRHTA requested the Corps to oversee this additional contract.

Biologist Barbara Cintron is the environmental technical project manager for the Pinones project. She will work closely with the Puerto Rico Department of Natural and Environmental Resources (DNER) and Forester Doreen Pares to oversee replanting both the upland and mangrove areas near the end of Puerto Rico's rainy season, around October or November.

"This project not only helps prevent beach erosion and flooding to the Pinones area, but it is also allowing safer access from the eastern part of the island to the metro area by both car and bike," said Robert Newman, project manager. "I like to think this project is helping to give back some peace-of-mind to its residents. I know it's already saved our sponsor upwards of a million dollars in road repairs that last year's storms would have caused."



Adair Martin, project engineer, stands on a portion of the newly widened and armored Highway 187 in Puerto Rico (Photo courtesy of Jacksonville District)

# Mosquitoes lose war at Eagle Island

By Penelope Schmitt  
Wilmington District

Even mosquitoes have to live someplace. For awhile, it looked like they had all settled on Eagle Island, a 930-acre U.S. Army Corps of Engineers dredge disposal site along the Cape Fear River in North Carolina. Before 1995, it was an infamous mosquito breeding ground. The swarms were so dense, they could be picked up on radar.

But Ken Sholar, New Hanover County's Mosquito Control Officer, is proud to report that times have changed. New Hanover County, Brunswick County, and the Corps teamed up to control mosquito infestation on Eagle Island before it spread to other areas.

"We all had a piece of the puzzle but, until we put it together, we weren't getting anywhere," Sholar said.

Rick Hickman, Mosquito Control Officer for Brunswick County, agreed with Sholar. "We were told by experts from Florida that 50 percent control of an area like Eagle Island was the best we could expect. Now we control 800 acres."

The intergovernmental group's success results from information and resource sharing among the three agencies. The Corps supplied contracts and the money to support them, plus some mechanical assistance. The counties supplied the vector control expertise and executed the program.

Since 1995, the group has successfully implemented an Integrated Pest Management program that drove mosquito populations down so they don't reach "migratory brood" levels.

"When the mosquito population gets dense enough, the females instinctively migrate to find new territory," Sholar said. "That could lead the mosquitoes to break out of Eagle Island, and we'd be spraying pesticides up and down the streets of Wilmington and in Brunswick County communities."

"That's why we fight the battle on Eagle Island, so we can avoid large populations of mosquitoes getting to where people live," Hickman said.

Partnership among the two counties and the Corps is critical in winning the mosquito war. Their three primary weapons are surveillance, sharing information and resources, and the timing of effort.

"It's a dynamic program," said Jeff Brown, a medical entomologist with the North Carolina Department of Environment and Natural Resources. "When these guys hit a seasonal peak of mosquito population, they have four to five days to treat Eagle Island, Brunswick and New Hanover counties, and the Intracoastal Waterway. It's critical that their information be accurate for them to get the job done."

"We've put our heads together with Howard Varnam, the Corps' project manager for Eagle Island," Brown continued. "By mapping populations and carefully tracking Corps work, we can treat 130 acres instead of 800 acres, use more environmentally friendly methods, and kill more mosquitoes."

Surveillance techniques range from primitive (How many mosquitoes land on your body in two minutes?) to counting the mosquitoes caught in light traps, monitoring rain gauges, and dipping water samples to see if they contain larvae. All this data is compiled on a computerized database and tracked weekly. It enables the mosquito control team to respond at the right stage of the life cycle to suppress populations before they explode into migratory broods.

Control methods are not only carefully timed, they are carefully chosen and targeted to maximize insect suppression, while minimizing environmental damage. "Up to 1995, before these three entities got together, the process was reactive," said Brown. "There was much more widespread spraying with insecticides. Now, the group has put together a truly proactive Integrated Pest Management program that uses mechanical and biological means to control populations, and turns to chemicals only at critical moments."

The array of biological control methods includes three



A dipper full of larvae once meant clouds of mosquitoes later. But now an Integrated Pest Management Plan heads off insect population explosions. (Photo courtesy of Wilmington District)

major weapons. Bti, a bacterium, destroys the stomach lining of mosquito larvae. Methoprene, a second biological, prevents the larvae from maturing into adults by overloading them with hormones that keep them in a juvenile stage. Finally, flooded areas can be stocked with mosquito fish that feed on larvae. "We like the mosquito fish and dragonflies best," Hickman said. "But Eagle Island is a constantly shifting environment. We can't keep areas flooded all the time."

That's where the Corps comes in. We're a major player in underwriting the program, and a direct agent in the mechanical control of populations.

First, the Corps makes a vital difference to the local governments' ability to work on the targeted mosquito breeding grounds.

"We don't have expert vector control people working for us in Wilmington District," said Varnam. "But we do have a great contracting office. We've written, solicited, and paid for contracts that provide New Hanover and Brunswick counties with the labor, equipment, and materials to do the job. They have expert vector control people who execute the contracts."

Varnam noted that two other counties, Onslow and Pender, also have Corps-funded contracts for vector (disease carrier) control on Corps-managed waterways.

Besides making a major contribution to funding and contracting, the Corps played a vital part in improving program effectiveness by coordinating their work schedule with the mosquito control officers.

"We know where the Corps is going, and what they'll be doing," Sholar said. "Mosquitoes are easy to control when land is flooded, and they're easy to control when it's dry. Whenever the land is transitioning from wet to dry or back again, that's when mosquito populations can explode. Since the Corps keeps us up-to-date on the times and places for work, we can monitor and control the situation."

"The Corps didn't know that what they did and when and where they did it could make a difference," Hickman said. "They thought every inch of salt marsh was prime breeding ground. Now that the Corps knows we can target vulnerable areas, they keep us informed, and even time their work so that it helps us to control mosquitoes better."

Best of all, the Corps actually buried a major brood of mosquitoes. By pumping dredged material onto



Labor-intensive monitoring by Brunswick County Vector Control staff helps keep mosquitoes in check. (Photo courtesy of Wilmington District)

known breeding sites in August, the Corps accomplished its mission, and also virtually wiped out the fall brood of *Aedes sollicitans*.

"I have nothing but respect for the help the Corps has given us," Sholar said. "As a result of our cooperative effort, we are able to keep the situation on Eagle Island well under control. I know I have more time to work with the rest of New Hanover County than ever."

What about this year on Eagle Island? The three agencies will use every resource in their arsenals, from mosquito fish to contracts, to ensure another safe year.

"They call it 'breaking the back of the hatch,'" Brown said. "The game is, you track each brood through the surveillance system. You adjust to the Corps' work schedule on the island, and coordinate with them to respond to potential changes and trouble spots. Then you can anticipate what kind of populations to control, at what stage, and hit hard."



# Enhance Capabilities

Market and capitalize on opportunities for mission growth.

## TeleEngineering

Continued from page one

ability to conduct secure communications with several people at one time," McCallister said.

**Teleconference.** "I've been doing video teleconferences with Headquarters and North Atlantic Division on the proposed future of the base here in Albania. During the teleconference, we had the charts on the wall so everyone could look at them at the same time, and we were able to zoom in and concentrate on a specific area if there were questions. It's so much easier than trying to explain everything over the telephone," McCallister added.

"We can also do a lot of preliminary analysis of the area without deploying a lot of people," said McCallister. "Experts from the Corps view the video tapes we send them from where they are, do the analysis, and send the information back to us here in Albania."

"TeleEngineering is a great way to transfer a large amount of data quickly," said Rusty Mizelle, an environmental engineer from Europe District.

He is deployed to Albania to conduct environmental surveys and develop a hazardous waste safety plan for U.S. Army, Europe.

"U.S. Army, Europe needed a record of existing environmental conditions, so I conducted an Environmental Baseline Survey when I arrived. Once I completed the survey, I had a lot of data to transfer, more than 100 pages of information with digital photos. Because of TeleEngineering, I could

send that data back to Europe District quickly and it worked well. In the past, we hand-carried the information which took a lot of valuable time.

"We're also working on a safety plan for disposing of hazardous wastes that affect our soldiers downrange," Mizelle added. "With TeleEngineering, we can close the gap with the guys on the ground and our safety office at Europe District.

"As we develop the plan, we're having meetings via video teleconference which has a lot of benefits. It's just like talking to someone face-to-face as opposed to a phone call or e-mail, and with all of the players involved at the same time," he said.

**Growing.** Currently, communication via TeleEngineering is only available from point-to-point, but it's growing, according to electrical engineers Bryan Register and Jeff Powell from WES. Both Register and Powell worked on the initial equipment setup.

"Soon we'll have a multi-point bridge capability so we can connect up to eight sites at one time," said Register. "We'll be able to hold video teleconferences simultaneously from Albania, to Europe District, to North Atlantic Division, to the Office of the Deputy Chief of Staff Engineer in Heidelberg. We're also looking at making the equipment in the field more portable and compact. It's growing and changing daily."

Powell added that live feeds from Albania are currently available on video teleconference which allows for even more flexibility. "Right now we can do live feeds with a cable hookup to the



Contract specialist Dwight Dukes (left), and environmental engineer Rusty Mizelle review some paperwork at the Task Force Operations Center in Albania. (Photo courtesy of Europe District)

camcorder," he said. "In the near future, we'll be able to conduct live feeds with audio, without any type of cable hookup. That allows the experts back at the Corps to actually tell the person running the camera to move in closer on a particular area."

**Access to expertise.** The Corps has worked on TeleEngineering for more than a year, says Leonard Huskey, a physical scientist at the Engineering Research and Development Center. He played a big role in the development of TeleEngineering.

"We've been working with the TeleEngineering concept for about a year, putting together a communications system that provides the entire spectrum of Corps expertise to deployed military and civilian engineers downrange," Huskey said. "TeleEngineering gives the deployed engineer access to that expertise — whether it's in North Atlantic Division, the Pacific Ocean Division, the Southwest Division, or the South Atlantic Division. With TeleEngineering, the Corps can offer a greater number of people to work the engineering challenge."

**Corps people  
move forward  
to support  
peace efforts  
in Albania**



Within 48 hours of the Kosovo agreement, Corps employees deployed to support NATO, helping build two base camps in Kosovo, conducting site surveys and environmental evaluations, and giving structural engineering support. Europe and Baltimore Districts are preparing another 30 people to deploy. Above left, surveyor John Miller, Europe District, is assisted on a site evaluation near Traina by two young Albanians. At right, Lt. Col. Larry McCallister, commander of Contract Construction Team 1 (left), and Col. Mike Barry, Europe District commander, take a break at the Task Force Operations Center in Albania. (Photos courtesy of Europe District)



The new hospital at Elmendorf Air Force Base, Alaska, is the first U.S. building equipped with sensors for self-monitoring. (Photos courtesy of CERL)

# Hospital knows how it's feeling

By Dana Finney  
Construction Engineering Research  
Laboratory

If "smart structures" that self-diagnose damage seem years away, welcome to the future! A new hospital at Elmendorf Air Force Base in Alaska will be the first U.S. building equipped with an array of sensors for low-cost, reliable condition monitoring. The sensors will provide unprecedented data on the structure's response to dynamic loads, and its health in general.

Engineers have long imagined smart structures — buildings that can be queried for critical information about their performance. The ability for a structure to warn its users of an impending failure is especially desirable. Ideally, if structures could be monitored throughout their life, small damages could be repaired before a failure, greatly reducing repair costs.

"Smart structural systems offer the potential to drastically cut maintenance and repair costs for both civil and military facilities," said Dr. Robert Quattrone, a researcher at the Construction Engineering Research Laboratory (CERL). Besides avoiding damage, structures that self-diagnose could offer more affordable repair options, since building owners could continuously monitor the materials.

The Elmendorf Composite Medical Facility in Anchorage, completed in 1998, is a 433,900-square-foot center with 110 beds serving some 45,000 customers a year. It is built to state-of-the-art seismic resistance because the local seismic classification is Zone 4, the potential for the strongest earthquakes.

"We get 4.5 [Richter scale] or higher shakers several times a year, and smaller ones come more often," said Peter Lam, Chief of the Structures Section in Alaska District.

The district is project manager for CERL's work at Elmendorf. The medical facility will be fitted with various types of sensors, including innovative, low-cost new devices. Placed at strategic locations throughout the building, the sensors will collect data on different building behaviors and report them to remote monitoring sites via the Internet.

The exact locations to install sensors come from sophisticated computer modeling. Using information such as the building's structural plans and recorded ground movements, a three-dimensional nu-

merical model shows the critical points in the structure. Depending on what parameter will be measured, the locations will have passive or active sensors.

"We'll collect three types of measurements," said Bruce Westermo, engineering vice president of Strain Monitor Systems (SMS) in San Diego. "The passive sensors will measure peak deflections at movement-resisting joints. Active sensors will give 'real-time' readings on strain and deflection. And accelerometers will record the building's movements at whatever point they are placed."

SMS, working with CERL under the Small Business Innovation Research (SBIR) program, is developing new wireless systems for passive and active real-time measurements. The passive devices use two approaches. One makes use of TRIP (transformation-induced plasticity) steels. This type of steel alloy is non-magnetic in its unstressed state. With stress applied, the material's atomic structure irreversibly changes, becoming magnetic. The degree of magnetism tells what a joint's peak deflection has been.

The other type of sensor employs conductive polymers that experience irreversible electrical resistance change in proportion to the applied peak displacement.

All sensors in the building will send data to smart junctions that use wireless communication technology to transmit information to a master unit and from there to the internet. Special software developed by SMS interprets the data into an easily digested format. Persons with access rights to the website can log in and read the sensor data. Further, if certain measurements exceed limits programmed into the software, a priority e-mail message is automatically sent to persons responsible for the building's upkeep.

Lam's office would be notified in such an event. "If we receive a report of damage in the building, the district would call the Air Force customer and we would put together a team to investigate," Lam said.

A major advantage of passive sensors is the ability to show peak deflections, information critical to develop an appropriate repair plan. By knowing exactly how much damage a joint sustained, engineers can return it to design standards.

Once a peak sensor has deformed with the building stress, it must be replaced or manually reset. "If the sensor shows damage at a level that repairs are needed, you're going to be working on the area anyway, and replacing or resetting the sensor can be part of that," Westermo said. The low cost of the sensors (\$400) makes them expendable, especially given the value of information gleaned from them.

The Elmendorf project is a major step in an ambitious research effort led by CERL and involving a diverse team from the Corps, other government agen-

cies, academia, and industry. Their mission is to provide inexpensive, reliable technology that gives the Department of Defense smart structural capability. "Using smart materials, we can reduce the cost of operations and maintenance, and extend a structure's life by 10 to 30 years," said Quattrone. "The Army has more than 140,000 structures with essentially no structural health monitoring. Smart materials technology can reduce life-cycle costs by 20 percent."

Different types of sensors have been around for years and used with varying degrees of success. Most are cumbersome to maintain and suffer from poor accuracy. SMS' breakthrough was their use of wireless, remote communications, low-cost materials, and the sensors' low energy draw. Most can be powered by batteries or photovoltaic cells. For remote operations, the junction boxes can be queried by cellular phones. The sensors' accuracy has been validated in the laboratory and at seven field sites.

SMS's innovative devices won the Construction Innovation Forum's NOVA Award in 1998 and the Civil Engineering Research Foundation's Pankow Award for Technology Innovation in 1997.

Besides flagging damage to the Elmendorf facility, the sensor array will reveal how a building responds under different seismic conditions. Without reliable data describing this behavior, structures have traditionally been designed conservatively to help them survive earthquakes. Similarly, building codes prescribe measures for seismic protection that represent best engineering guesses.

"The information from the sensors will be important in checking our assumptions for seismic design," Lam said. "Usually we'll design a building by assuming a certain kind of earthquake ground motion, but we've never had anything to verify that. By knowing how much a building really deflects, we'll be able to refine our design criteria."

Doing so could mean less conservative and less expensive construction. Moreover, the sensors can provide information that allows use of lighter, cheaper materials such as polymer composites by defining their confidence limits. Composite materials with smart tags would allow life-cycle monitoring for safety.

The Elmendorf facility should be fully outfitted with the sensors by next summer, with work starting this fall. SMS, Alaska District, and CERL will have remote access to the data.

Quattrone noted that researchers have little concern that the facility will fail in an earthquake. "This is an incredibly strong building design," he said. "But if any damage *does* occur, we'll be able to address it quickly to ensure the occupants' safety. At the same time, we have the opportunity to provide exciting information to the structural engineering community."



Enhance  
Capabilities

# 'Cyberclipboards' make job easier

## Integrated systems technology surveys structure damage

By Randy Piersol and Ed Voigt  
Philadelphia District

Some tasks are so routine and repetitive that they inevitably raise the question, "Isn't there a better way?"

One such task is structure inventory, the first step in assessing potential damage from storms or other natural disasters. It involves categorizing physical structures (houses, apartments, hotels, restaurants, other places of business) in a study area. For U.S. Army Corps of Engineers shore protection projects, that area is usually defined by the first two to four blocks behind the beachfront. The study team uses this inventory to determine the estimated depreciated replacement cost for structures within the area.

### Better way

And yes, there is a better way, and it is called integrated systems technology. Just ask the Philadelphia District feasibility study team for Barnegat Inlet to Little Egg Inlet. They were the first in the Corps to apply this technology along New Jersey's Long Beach Island back in 1997. Soon after came similar applications for two other New Jersey studies, Manasquan Inlet to Barnegat Inlet and Great Egg Harbor to Townsends Inlet.

Traditionally, the field inventory crew would carry clipboards with data sheets, aerial photography blueprints identifying structures to be inventoried, and 35mm cameras. For studies where the total number of structures is just in the hundreds, that system works well enough.

But along Long Beach Island that number was more than 2,000. To record that much information on paper forms, return it to the office, circulate it for review, store it in file cabinets, and manually type it into a computer would be extremely time-consuming.

In view of this challenge, three study team members began brainstorming for ways to automate the process.

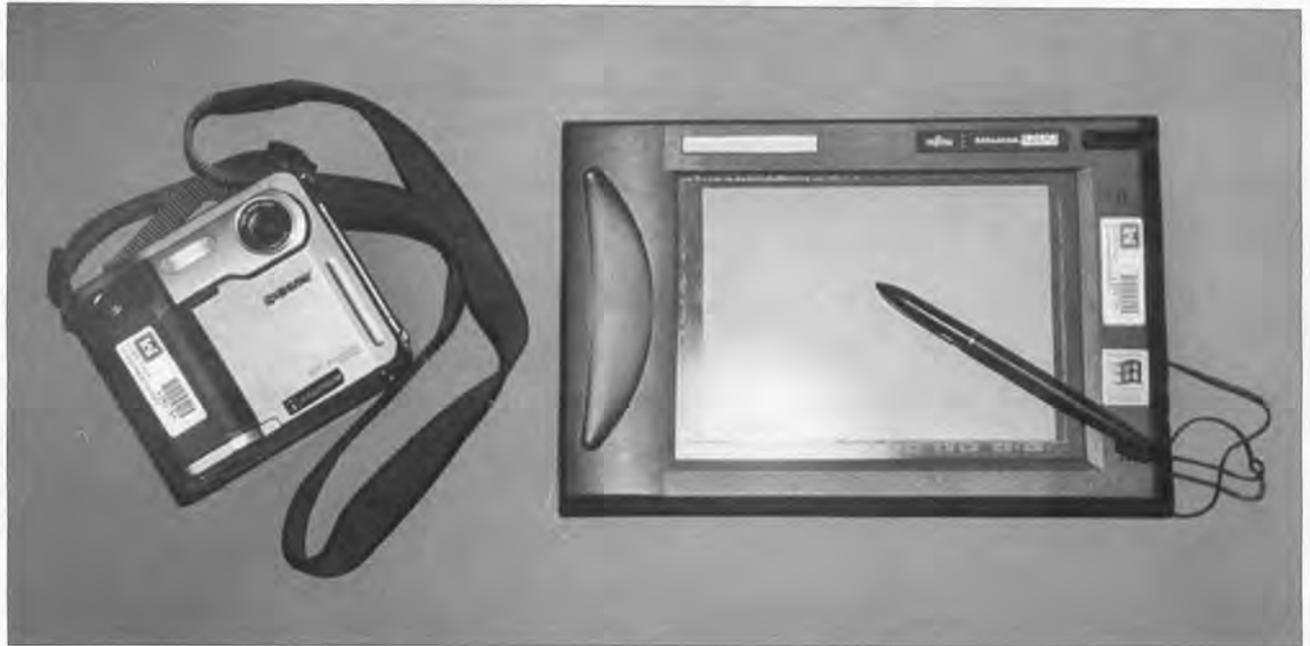
"I can't stand the thought of unnecessary work," said study manager Randy Piersol. "With laptops and bar-coding technology, we knew there had to be a way to make this task simpler, faster, and less costly without sacrificing quality."

Team economist Dan Abecassis and coastal engineer Murphy Flynn reviewed the data required and the methods needed to obtain that data.

### Hardware

"Basically this meant walking up and down streets filling in columns with structure data, quality and condition, taking a first floor elevation, and taking a photograph for reference," said Abecassis.

The study team decided to use an integrated systems approach. To record the inventory they used two Fujitsu Stylistic 1000 handheld personal computers (PCs), each equipped with a pen stylus for data entry. They used Dycam Model 10-C digital cameras to photograph each structure and later download the images to the computer.



Above are the tools of the trade, a Sony digital camera (left) and a Fujitsu Stylistic 1200 handheld PC. Left, study team member Nathan Dayan photographs a residence with a digital camera while study manager Randy Piersol and study team member Francis McPhail record structure inventory data on a handheld computer. (Photos courtesy of Philadelphia District)

The result was a paperless structure inventory, complete with both statistical and visual data.

### Time saver

Eliminating redundant steps was the greatest time saver. The database software in the handhelds stores data in DBF format for import into almost any other database or spreadsheet program, so no one has to retype the data into a PC. And using digital cameras bypasses the steps of processing photographs and writing the addresses on the back of each print.

For comparison, the field crew did part of the inventory with pen and clipboard. Once they switched to the handheld PCs, they found they were working almost as quickly as with the old method. Most important, integration of systems allowed instant downloading of the data into the Marshall & Swift Residential and Commercial Estimator Programs back in the office, saving weeks of data entry for economic analysis.

### Upgrades and advantages

Structure inventories for Manasquan to Barnegat (about 2,800 structures) later in 1997, and Great Egg to Townsends in 1998, followed this pioneering effort. Along the way those study teams streamlined the data entry form and upgraded to more powerful Fujitsu Stylistic 1200 handhelds and Sony digital cameras.

The study teams have found these advantages to using integrated systems technology:

- Eliminating repetitive tasks and reducing the labor-intensive photography process.
- Lower costs associated with structure inventory.
- Data input via a user-friendly graphic interface, with user-defined pick lists, pick boxes and date entry fields.
- Interface to other peripherals through screen icons, which access modules such as the digital camera interface.
- Image capture and processing built into the software, eliminating multiple programs.
- Images that can be instantly downloaded into the database and automatically linked to each data record, minimizing loss or mismatching of files.
- Information that is instantly available in a digital format.

Having proven this technology three times in the field, the district is looking at enhancements. For instance, through integration with Global Positioning Systems and other software, a field crew could determine coordinates for a structure, call up an aerial photo on the PC, click on that structure and go right to its data entry screen. Potential applications extend beyond planning to include regulatory permit and enforcement actions and bridge and dam inspections.

"This system is easy to use, easy to handle, and very effective for what we need," says Piersol. "We won't be going back to clipboards anytime soon."



# Project information available on Internet

By Rob Holland  
South Atlantic Division

The Programs and Project Management Delivery System (PPDS) is coming to a web browser near you. PPDS is a web-based portal into the world of U.S. Army Corps of Engineers projects — military, civil, environmental, and support for others. It is currently under development, located on a server in Mobile District at <http://samdev.sam.usace.army.mil/ppds.htm>

OK, enough techno-babble. What does PPMS do? Drawing its data from the Corps' database structure (the Corps of Engineers Financial Management System, the Project Management Information System, and soon the Requirement Management System), the new system serves multiple functions. It is an executive information source, a project management tool, and a collaborative environment for teaming up internally, and with customers and partners.



Enhance  
Capabilities

"A district engineer can check up on the progress of a levee project," said Bill Stein, a South Atlantic Division (SAD) project manager who led development of the system. "A director of engineering and housing at an installation can see the latest information on projects he's monitoring, and the project manager can track schedule and budget, participate in online discussions with customers, and re-

port to his boss, all at the same time."

PPDS development evolved for several years as the Corps worked to create more efficient ways to do business in a downsizing environment.

"It evolved out of the business process review in SAD," Stein said. This later became part of the Test Division Initiative. "Once we analyzed our processes and began to move toward corporate standards, we needed a Corps-wide collaborative environment that was easy to use and universally accessible."

The road has not always been straight, however. "The technology and information management systems the Corps uses have changed rapidly over the last several years," Stein said. "When we first conceived of this 'virtual workplace,' the state-of-the-art was proprietary groupware. So our first choice was Lotus Notes. We thought we were going to have to install Notes on everyone's desktop to use the system."

Since then, the World Wide Web has become the vehicle for online collaboration and information distribution. PPDS, while still using Notes for part of its structure, has moved to the web.

Although SAD developed the first PPDS prototype, it has been adopted for implementation throughout the Corps. Working against a deadline (end of fiscal year 1999), Corps divisions and districts are coming online on a sequential schedule.

"The success of the system will depend on the integrity of the data," Stein said. "Those districts who have already entered their projects into PROMIS are finding this system to be beneficial."

The system can already pull budget and expenditure information from CEFMS, and will get con-



struction progress data from RMS when it is fully fielded.

"It's very important to the success of the system that additional data entry be avoided," said Stein. "Project managers have reported that they spend about 50 percent of their time answering questions about their projects. The system should help them recover some of that time, but they don't need to spend it re-entering data."

Stein said the new system has been well-received. "Everyone we've shown it to has been enthusiastic about its possibilities. At the same time, there's some concern about the vulnerability involved in having all your information hanging out there for the world to see. Ultimately, though, total openness will lead to better project management, and better relations with our customers."

Following the initial effort to get all projects into the system, the development team plans to subject it to review by customers. "The most important use of this system may be collaboration with customers," Stein said. "We need to get their input into its further development so that it meets their needs as well as ours."

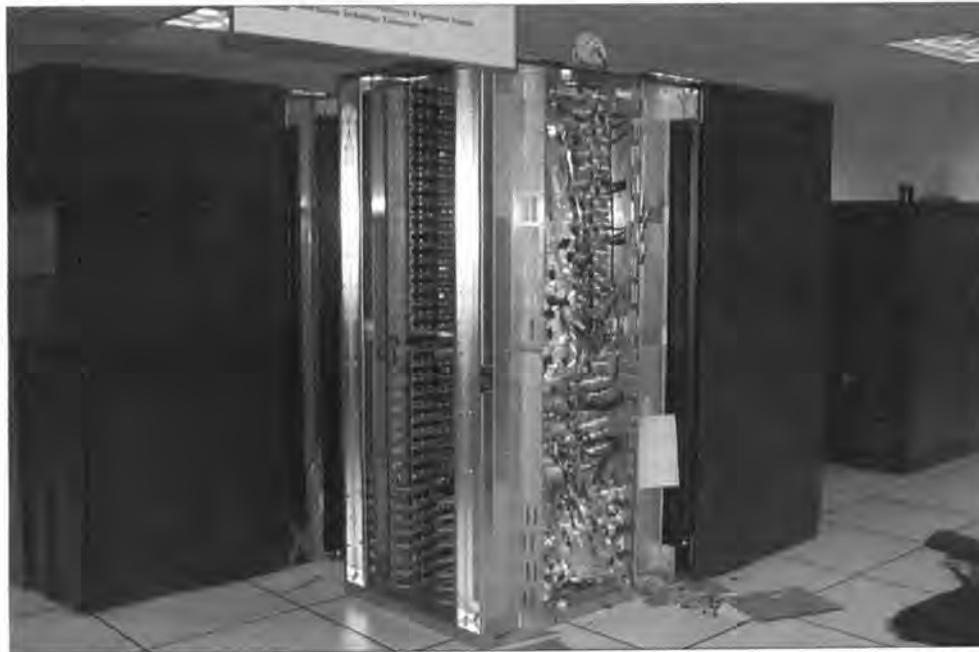
## Vicksburg is major computing center

By Jennifer King  
Engineer Research and  
Development Center

The quiet southern town of Vicksburg, Miss. is deceptive. With numerous pre-Civil War homes and the Mississippi River, Vicksburg has a facade of old world charm and grace. But behind that facade are technological capabilities that place Vicksburg on international lists of supercomputing giants.

At the Engineer Research and Development Center (ERDC), the Department of Defense's (DoD) Major Shared Resource Center (MSRC) operates one of the 10 most powerful high performance computing sites in the world. This supercomputing center is part of the DoD High Performance Computing Modernization Program, which serves engineers and scientists throughout DoD.

"The MSRC's mission is to support the warfighter," said Bradley Comes, MRSC director. "This means using supercomputing in advanced research and development projects. By using DoD resources, scientists and engineers are able to significantly reduce defense system costs by shortening the design cycle and reducing reliance on expensive and destructive experiments and



Upgrade work reveals the inner workings of a Cray supercomputer. (Photo courtesy of Engineer Research and Development Center)

prototype demonstrations."

Comes pointed out that the capabilities impact the entire spectrum of military programs.

"The MSRC is a DoD facility that supports the Army, Navy, Air Force, and other DoD agencies," he said.

The tremendous computer power at the MSRC can help soldiers in the field.

For example, the MSRC modeled wave motions from the dangerous Ponce Inlet off the Florida coast. This inlet is notorious for patches of rough water, which have capsized boats entering or leaving the inlet. Calculation times of water activity like this might take six months, but the MSRC employed advanced programming techniques to

perform the calculations in only 72 hours.

But how does this help the soldier in the field?

"The military wants to locate dangerous areas of water so they won't moor a ship there, for example, or send a team of Navy SEALs or Army Rangers through that area," said Dr. Henry Gabb, who leads the MSRC Computational Migration Group. Amphibious operations remain very dangerous, and these capabilities help protect soldiers from perilous waters.

To perform that kind of application, the MSRC used a computer program developed by Dr. Zeki Demirbilek of ERDC's Coastal and Hydraulics Laboratory. This program used wave patterns to predict harbor conditions while taking into account the harbor shape and man-made structures such as piers, jetties, breakwaters, and islands.

The program can perform two functions — nowcasting and forecasting. Nowcasting allows scientists to model what is happening in a harbor at any given moment. Forecasting allows scientists to predict what will happen under a certain set of circumstances.

"This was truly a super team effort with the MSRC taking the lead role in

Continued on next page

# Storm adds realism to 249th training

Article and Photo  
By Jim Pogue  
Memphis District



(Left to right) Staff Sgt. Robert Burns, Daphlyn Koester, and Staff Sgt. Lee McClellan inspect an emergency generator in Jackson, Mo. (Photo courtesy of Memphis District)

They thought they had a simple assignment. The soldiers of the 249<sup>th</sup> Engineer Battalion (Prime Power) would deploy to Cape Girardeau, Mo., on the Mississippi River to assess the town's emergency power needs should a disaster strike. They would also train Memphis District's Emergency Power Planning and Response Team (PRT) on how to respond to a power supply mission from the Federal Emergency Management Agency (FEMA).

But nature had a surprise waiting.

On their first night in town, a violent storm swept through, knocking out electricity and natural gas service. The exercise took on unexpected realism, but the men and women of the 249<sup>th</sup>'s Bravo Company from Fort Bragg, N.C., simply rolled up their sleeves and completed the mission.

Civil engineer Steve Williamson is the Emergency Power PRT's action officer for Memphis District. "When the Prime Power team visited Memphis in 1997, they did their power needs assessment in an urban area," Williamson said. "They visited more than 150 locations and determined the best ways to provide emergency power to each. This year we wanted them to do the same kind of work in a more rural setting."

The Prime Power/Memphis District team, led by 1st Lt. Toni Grimes, Bravo Co. executive officer, arrived May 17. Williamson gave Prime Power leaders a database listing critical facilities in the Cape Girardeau area.

The soldiers visited each site, decided what size generator was needed for emergency power, determined the equipment and materials needed to in-

stall the generator, and identified where the generator should be placed.

They entered their results in the database each day, and transmitted the updated information from Cape Girardeau to Memphis District daily.

The original plan called for two platoon command posts and nine two-person teams covering the assessment area. But when the storm swept through, the soldiers quickly went to Plan B.

With no electricity for computers and other equipment in the Earthquake Center at the Southeast Missouri State University campus, Chief Warrant Officer Brian Gore, commander of first platoon, set up operations in the hotel where the soldiers were billeted. Later

that day, they moved the command post to a building at the university equipped with an emergency generator.

Ironically, the storm seemed to work in their favor. "After the storm hit, the local residents were much more receptive to our soldiers and their efforts," Gore said. "The storm seemed to open their eyes, and they saw just how important the work we were doing was. They realized they really needed us."

On the local level, Mark Winkler is the Missouri State Emergency Management Agency's area coordinator for southeastern Missouri, including Cape Girardeau County. Memphis District and Prime Power leaders worked closely with him to coordinate the combined

assessment and exercise.

"We asked the Corps to do this work for two reasons," Winkler said. "First, FEMA has designated Cape Girardeau as Missouri's Project Impact Community. There's currently a big push in emergency management toward mitigation, to take as many actions as possible *before* a disaster to lessen its severity. The Project Impact Communities, one in each of the 50 states, are developing these mitigation procedures. In this case, we were identifying critical facilities and taking steps to make them more useful by arranging for emergency power.

"Second, Cape Girardeau is a progressive emergency management community," Winkler said. "City and county leaders have always been willing to take on any project that will help the community. They know how important emergency management is, and have proven their community is an excellent test bed for new ideas."

Winkler was pleased with how the combined assessment and exercise went. "I have nothing but positive things to say," he said. "The soldiers were all professional and courteous, and everyone was pleased with their work."

Winkler believes the soldiers' week-long presence in the community was positive. "The kids in the area got a real kick out of seeing soldiers at their school," he said. "The storm that went through the area also raised the community's awareness of just how important this work is. A local company donated cellular telephones to help the Prime Power team with their communication needs, and their hotel didn't charge them to use the conference room as a temporary command post."

Working in concert with the Prime Power soldiers, Memphis District's Readiness Branch activated their Emergency Power PRT. Led by Williamson, team members simulated their response to an actual disaster situation. They spent one day onsite in Cape Girardeau observing the Prime Power team, and the rest of the week practicing their emergency duties from Memphis.

Williamson was also pleased with the combined exercise and assessment. He said the information gathered will be used in a variety of ways. The completed database will be available on Memphis District's internet site for other organizations and agencies to use. Printouts will be given to Cape Girardeau and Missouri emergency management leaders.

"We'll also be comparing our list of available generators to the needs that have been identified by this assessment, and work on locating additional generators," Williamson said.

The work will also help Readiness Branch personnel refine their procedures for reporting and assessing emergency power needs in future disasters.

"Memphis District is number two on the response list this hurricane season," Williamson said. "The lessons we're learning here will help us do a better job restoring emergency power if we go on a hurricane recovery mission."

## Computers

Continued from previous page assisting me, a practicing engineer," Demirbilek said. "Our joint effort has allowed me to more effectively use the computational resources available via MSRC mainframe machines."

The MSRC also uses modeling and simulation applications such as virtual proving grounds.

"Supercomputers allow...scientists and engineers to tackle scientific problems in a 'virtual proving ground' where we can simulate the performance of off-road military vehicles very accurately," said Comes. "For landmine clearing, computer modeling...helps scientists and engineers evaluate different plow designs to determine the forces acting on the blade and it's optimum shape, speed, and depth of the plow."

In military activities, breaching vehicle blades move in front of the soldiers and are used to clear mines, wire obstacles, anti-mine ditches, and rubble. In a current study of a breaching vehicle blade, the supercomputers are being used to simulate the blade's interaction with more than 10 million

soil particles. This type of modeling helps determine how different ground conditions exert different pressures on the plow blade and tines.

Understanding the pressures on the blade is vital to mission success. If the breaching vehicle does not plow below the mine burial depth, it may miss mines. If plows too deeply, the vehicle may stall.

The MSRC recently awarded a new contract for improvements. With the upgrades, the MSRC will have a peak computational performance rating of 1.4 trillion operations per second.

"This contract reinforces the MSRC as a unique and world-class supercomputing facility due to its ability to support a multitude of high performance computing architectures using leading-edge technology," said Comes.

The improvements included upgrading a Cray T3E supercomputer from the existing 336-processor system to a 544-processor system. The larger system allows users to use up to 520 processors on a single computer program, a significant increase in capabilities for addressing large research and devel-

opment challenges. During the first day of use, the new system handled the largest single computer program ever executed at the MSRC.

The contract also provided for installation of the latest IBM supercomputer, the IBM SMP. The new supercomputer is scheduled for delivery and installation this fall. This upgrade will enable users to solve larger problems, produce finer resolution of problems, enable the MSRC to service a larger number of users, and prepare the research and development community for future supercomputing technology. Users will be able to see details in problems that before remained hidden, and they will be able to run faster computations, thanks to the increase in computational power.

The High Performance Computing Modernization Program is designed to provide advanced hardware, computing tools and training to researchers to support the warfighter.

By using the latest technologies, researchers in Vicksburg can help the military maintain its technological supremacy both on and off the battlefield.

# Omaha is fuel expertise center

By Thomas O'Hara  
Omaha District

Omaha District has a long tradition of delivering quality military design work. The district was recently designated the Center of Expertise (CX) for Petroleum, Oil and Lubricants (POL) Systems designs in the U.S. Army Corps of Engineers.

"We've anticipated this for quite some time now," said Jimmy Brasch, project manager. "It just recently became official."

The POL CX is the fifth center of expertise in Omaha District. The others are the Hazardous, Toxic and Radioactive Waste Mandatory CX (MCX), Protective Design MCX, Transportation MCX, and Interior Design and Space Planning CX.

Brasch has long touted the success of the district's design team. In January he spoke at the Worldwide Energy Fuels Conference in Washington, D.C., on the "Type III Hydrant Fueling System and the People Behind it."

The Type III system is a standard design, updated in Omaha, which delivers fuel to aircraft and aircraft fueling trucks through a looped underground piping system. It improved on the Type II system by designing the system to be based on "closed loops" (which prevent dead-end surge problems), redundancies, and controlling supervision that practically assures

uninterrupted fueling and de-fueling. "Reliability, redundancies, and flexibility are the main requirements of this system," said Brasch.

The system also improves fuel quality through state-of-the-art storage facilities, oil/water separators, and filters.

After several years of design and operation experience, the Department of Defense (DoD) approved the updated standard Type III Hydrant Fueling System as a site-specific design guide.

Even before the CX designation, Omaha District received numerous inquiries on its fueling systems design program. "We're getting calls from all over the country," said Brasch. "People are interested in tapping into the experience and knowledge in our fuels team."

A significant part of the Corps' fuels system design experience exists in a team of Omaha District designers. The district kept the fuels design team basically intact. Some members have been there as long as two decades.

"When a team works together long enough, they tend to 'read each other's minds' and know what the other person needs to get the job done," said Brasch. "We're fortunate that we don't have to backtrack on the learning curve for fuels systems. We've been able to keep moving forward."

This consistency in ability is recognized by the end users of the fuels sys-



The Air Force is a major beneficiary of Omaha District's fuel expertise. (Photo courtesy of Omaha District)

tems. "You cannot rely on past engineering firms maintaining fuels expertise," said John Droppelmann, Air Mobility Command Defense Fuels Program Manager. "The only stability we can depend on is the Corps of Engineers in Omaha."

Despite a shrinking DoD budget, the need to maintain quality fuels delivery systems is key to getting DoD's aircraft off the ground. According to Bud Doll, Fuels Engineer with the Air Mobility Command, hydrant fueling systems are one of the most important military construction programs that support the flying mission.

To provide outstanding customer care, while practicing the One Door to the Corps philosophy, the Omaha Dis-

trict design team worked with several other districts and federal agencies through the years.

"We're currently working with Seattle District in a virtual teaming process for a project they're involved with," said Brasch. "They handle the contract award, soils work, surveying, and construction. We accomplish the design work, shop drawing review, and technical support."

Points of contact for the POL-CX are Jimmy Brasch at (402) 221-4916, Kenneth Andersen at (402) 221-4658 and Joseph Pesek at (402) 221-3061. Information about the POL-CX and other Omaha District CXs can be found on the district homepage (<http://www.nwo.usace.army.mil>).

# Superfund site sees improvement

By Dan Sirkis  
Philadelphia District

Since 1982, Philadelphia District has worked for the Environmental Protection Agency (EPA) to help clean up the Lipari Superfund Site in Gloucester County, N.J.

Lipari, formerly an uncontrolled toxic waste landfill, was once the nation's number one Superfund site. The National Institutes of Health linked exposure to chemicals leaching from the landfill to low birth weight and premature babies in the vicinity.

The district installed one of the first Superfund soil/bentonite cutoff walls at Lipari in 1983. This underground wall and a high-density polyethylene landfill cap helped stem the flow of contamination from this site into an adjacent stream and Alcyon Lake.

Sixteen years later, the site has dramatically improved. Alcyon Lake, which had been contaminated with chemicals and sewerage, was dredged, reopened, and stocked with fish. A multimillion dollar recreation area covers the decontaminated marsh sediments. New trees are growing in the formerly contaminated marsh beside this toxic dump.

Yet for all the successes, the landfill itself remains contaminated. Some of the contaminants have proven difficult to remove by flushing the landfill with water. Only the more water-soluble chemicals have been significantly cleaned up.

The Corps has operated a groundwater treatment

plant at the site since 1992, with annual removal rates of contamination increasing to a high of about 30,000 pounds in 1997.

EPA tasked the Corps with improving the rate of decontamination. Resident Engineer Steve Creighton asked Geotechnical Section for help, and they developed a novel approach to speed remediation.

They came up with the idea to use two existing horizontal gas collection pipes. The pipes and their associated vents were installed in 1983. The horizontal wells were designed to allow landfill gases (passively filtered through carbon) to vent from the landfill. The horizontal pipes are more than 800 feet long and situated under the cap in the most contaminated area of the



The thermal oxidation unit extracts 15 lbs. of contaminants per hour. (Photo courtesy of Philadelphia District)

landfill. They are built of slotted PVC in a one-foot-wide gravel trench. Geotech realized these two wells were well-suited for Soil Vapor Extraction (SVE).

The theory behind SVE is that by drawing a vacuum in the horizontal wells, large volumes of air can be moved through the contaminated soil. Most of the contamination is volatile organic compounds (VOC) including benzene and xylene, which easily vaporize and can be removed as gas.

Dan Sirkis, Creighton, and project manager Sharon Fang presented the idea to the EPA remedial project manager. EPA decided to try this approach and had its contractor, CDM, design a system to collect and destroy gasses from the wells.

A thermal oxidation unit (TOU) was leased from Vapor Extraction Technology, Inc., and shipped to the site. The unit is designed to destroy 99.999 percent of the VOCs in the gas stream.

Because one by-product of thermal destruction of chlorine and sulfur compounds is acids, a scrubber was also leased to remove acids from the effluent gas.

Since going online in February, SVE has lived up to its billing. An initial test of the system removed more than 200 pounds of contamination from the landfill in just two days, and it now extracts 15 pounds of contaminants per hour (compared to three pounds from the groundwater treatment plant). The successful removal of VOCs accounts for most of the difference.

The leased TOU is part of a pilot test that will likely result in installation of a larger system in late 1999.

# Ft. Leonard Wood gets major facilities

By Ida Burford  
Kansas City District

The Army's military police and chemical soldiers have new state-of-the-art training facilities in their new home, thanks to Kansas City District.

In June 1995, the Base Realignment and Closure (BRAC) Commission recommended moving the U.S. Army's Chemical School and Military Police School from Fort McClellan, Ala., to Fort Leonard Wood, Mo. To support this move, the two schools required new facilities. Kansas City District (KCD) managed construction.

## Applied Instruction Facilities

The Applied Instruction Facilities (AIF) project was designed by the Gossen-Livingston Architectural Engineering firm of Wichita, Kansas, and provides about 190,000 square feet of new facilities. Hensel Phelps Construction Company completed this \$30 million project in March, more than two months ahead of schedule.

The AIF project is really three projects on three sites to accommodate the training and storage needed by the Chemical and Military Police schools. The project includes an MP Village, Chemical Defense Training Facility (CDTF), and an addition to the post museum.

"Our biggest challenge with the AIF was that the construction varied so much in materials and in the size of the buildings," said Randy Barr, Hensel Phelps' project manager. "Each building is unique and there were more subcontractors involved, so coordinating the subcontractors was also a big challenge."

Building materials ranged from masonry construction with brick veneer, structural steel, and metal siding to wood frame with metal siding and composite shingle roofing on many smaller structures. Each of the areas had separate foundation crews so they could start independently, as if they were three separate construction projects.

## MP Village

The MP Village resembles a small town complete with houses, 21 storefronts, and eight roads. Military police, confinement facility personnel, and special reaction team personnel will use the "village" for realistic training.

This state-of-the-art complex contains 16 separate facilities. Nine buildings make up the east side. They include an MP administration facility, an interview facility, a mock MP station, a confinement facility complete with guard tower/shack with five detention cells, an administration/unarmed self-de-



The MP Village will be used to train soldiers at the Military Police School in all aspects of police work. (U.S. Army Photo)

fense building, two buildings dedicated to firearm simulators and night fighting squad tactics, and a family advocacy training facility.

The remaining seven buildings of the lower village are for advanced law enforcement training and include a two-story, 48,000-square-foot instructional facility and a complex of six mock buildings for practicing nearly every conceivable scenario that could warrant police action.

The 14<sup>th</sup> Military Police Brigade will train in this new facility, with an estimated 12,500 students to train this year.

## Chemical Defense Training Facility

KCD gave the CDTF to the Chemical School on Feb. 1. After three-and-a-half years of environmental and safety planning, facility design, and construction, this is the first building ready for operation.

Designed by the Benham Group of St. Louis, the new facility incorporates a host of safety features including emergency generators, negative pressure system, continuous air monitoring, redundant air filter systems, waste water containment and neutralization, and it's earthquake- and tornado-proof.

"This system greatly increases the staff's safety

and operational monitoring capability," said Maj. George Heib, Director of the CDTF.

This highly technical and complex facility is the only one of its kind in the Department of Defense. It will be used to train personnel on the detection and decontamination of live toxic agents. More than 4,000 personnel from all services will train there annually. Training is scheduled to begin in October.

The 69,000-square-foot building cost \$28 million and covers about 13 acres. Barr said the CDTF construction was very complex. "Each of the different monitoring systems was unique for this project — mechanical, electrical, and controls," Barr said. "This building was the smallest in size of the four BRAC projects, but the most complex in construction with a price of more than \$400 per square foot."

The facility has two main structures — the training building, which is the largest, and the administrative/classroom building. Besides these two main structures, the site work was extensive with many associated support structures including a guard-house. The foundation is spread footings with grade beams. Load-bearing construction predominates with exterior brick facing. The predominant roofing type is standing seam metal roof on both the training and administration buildings.

The training facility includes controlled decontamination exercise areas, a medical clinic, laboratory, classrooms, and associated support facilities. It also includes negative-air pressure training bays, a technical support section to clean, service and certify protective equipment, a laboratory for storing and mixing toxic agents, mechanical air filtration system with charcoal filters, and an autoclave.

## Museum

KCD is expanding the existing museum to curate artifacts from the Chemical Museum and MP Museum. The new two-level 42,380-square-foot museum warehouse is temperature and humidity controlled, contains an automatic fire sprinkler, areas for large-sized artifacts, and a workshop area.

The facilities built for the AIF will give the Military Police and Chemical Corps world-class training facilities. The schools' move from Fort McClellan to Fort Leonard Wood will be completed by September, with training scheduled to start in the new facilities this month.



Chemical troops will train in the state-of-the-art Chemical Defense Training Facility. (U.S. Army Photo)

# Divers enjoy exciting duty



All Corps divers have a support team who double-checks their gear before each dive. (Photo courtesy of Rock Island District)

## Part-time frogmen perform vital service to navigation

By Bernard Tate  
Headquarters

"If one of our navigation structures fails, that's an emergency for me," said Col. James Mudd, Rock Island District Engineer. "Someone has to dive down there and fix it to keep the pool up and keep navigation going. I don't have time to hire contractors."

That's why 14 U.S. Army Corps of Engineers districts, plus the Waterways Experiment Station, have their own divers.

"We have about 175 divers throughout the Corps," said Frank Trent, who oversees the diving program in the Safety and Occupational Health Office at Headquarters. "They're all part-time divers. They're welders, machinists, or lockmen, with diving as an additional duty."

"Our divers are limited to light-duty underwater work — inspections, underwater photography, marine life surveys, and light mechanical repairs," Trent added. "The overwhelming majority of our dives are surface-supplied air. No mixed-gas diving. On rare occasions, we'll dive tethered scuba with communications. Basically, we limit them to no-decompression dives. If the job is outside those limits, or if we've got a long-term heavy project, we'll go with contract divers."

However, Corps divers still have plenty of work, and it's not boring.

"In a normal year we'll make about 30 dives," said John Wayne, a crane operator supervisor and acting dive coordinator for Rock Island District, which has 12 divers. "We dive exclusively surface-supplied air because the conditions of the Mississippi River (swift currents and murky visibility) precludes scuba diving."

The Rock Island divers' work includes underwater inspections of hydraulic structures, light underwater salvage, inspection dives on towboats and other vessels, and underwater cutting and welding like cutting damaged steel and welding patches on barge and boat hulls.

In reservoirs, the divers inspect flood-

control gates, discharge tunnels, and stilling basins.

Having in-house divers offers several advantages to the district.

"The primary advantage is timely response," said Ed Gawarecki, a mechanical engineer and dive coordinator for Buffalo District, which has five divers. "If you have an immediate need for divers, you've got them on-site. Another advantage is familiarity. The same people dive the site over and over. If there's reduced visibility, they're familiar enough with it to still work effectively. They're also familiar with all the local equipment. If something goes wrong with a piece of equipment underwater, they know what it is, how it was installed, and how it works. And they already know the Corps' diving policies and safety regulations."

Using in-house divers also saves the district money.

"We did an audit a few years ago and found we were saving money by using our own divers," Gawarecki said.

Buffalo District divers also like surface-supplied air. "It gives us constant voice contact with the diver, which is safer," said Gawarecki. "And scuba has a limited air supply, while surface air allows the diver to work as long as needed, which is safer and lets him accomplish more."

While the dive teams work for their local commanders, the Corps' Safety Office is responsible for setting policy and providing training.

"The Corps has had divers ever since the technology was perfected, but in 1976 we formalized and unified the program," Trent said.

The average Corps diver is a man in his forties. The Corps requires full annual physicals for divers, and a minimum of 12 dives a year to stay current. The Corps also has strict manning levels for its dive teams.

Corps divers must take a four-week Basic Diving Course, and refresher training every four years. Commercial diving contractors teach both courses.

"You have to be a certified diver to attend the basic course, which covers



No Corps diver ever dives alone. Above, a dive team member holds a diver's safety line as he enters a lake. (Photo courtesy of Rock Island District)



A Corps dive team sorts mineral samples brought up during a dive. (Photo courtesy of Rock Island District)

both scuba and surface-supplied air," Trent said. "The eight-day refresher course updates our divers with state-of-the-art techniques. If any of our divers need specialized training, like underwater welding, their district sends them to top-quality local schools."

The local district pays for all of their divers' equipment.

"We're not cheap in buying equipment," Trent said. "We insist that the teams select state-of-the-art gear from the Navy's list of approved equipment."

"We use the Superlight 17 helmet, and the 27 on occasion," said Kenn Shoe-

maker, Rock Island District's Assistant Chief of Operations and Diving Coordinator. "We provide air with an eight-cylinder cascade system and use the Ameron communication and air monitoring system. We have both wet and dry suits because we sometimes dive in ice conditions. Our tools include everything from hand-tools to underwater welding gear and chainsaws."

"We have two missions," Trent concluded. "To ensure that field commanders have well-trained, experienced divers when they need them, and to ensure that they operate safely."

# Around the Corps

## Ice control model

Buffalo District and the Cold Regions Research Engineering Laboratory (CRREL) recently joined the towns of Eastlake, Seneca, and Vermilion in New York to find a solution to ice jam flooding on Cazenovia Creek in West Seneca.



The Cazenovia Creek model can simulate any water conditions. (Photo courtesy of Buffalo District)

Edward Gustek, Jr. a civil engineer in Buffalo District's Planning Branch; and Lawrence Sherman, a hydraulic engineer in the Hydraulic and Hydrologic Engineering Section; took members from the New York State Department of Environmental Conservation (NYSDEC),

West Seneca, Vermilion, and Eastlake to CRREL to view a model of a low-cost ice control structure that may be installed on Cazenovia Creek.

A refrigerated building held a scaled-down model of Cazenovia Creek. A series of piers would let the creek flow through, but stop the ice from moving downstream and jamming.

"The piers will do the same job as a conventional dam, but without the impacts," said Gustek. Installing the piers would cost around \$1 million, com-

pared to \$3.1 million for a dam.

This will mark the first time that the Corps has ever installed piers in a creek to ease flooding.

"If this works for Cazenovia Creek, imagine what we could do for other waterways that have ice jam flooding," Gustek said.

If the model is successful, plans and specifications for Cazenovia Creek could be ready in a year. NYSDEC would acquire the lands and easements for the project.

## Correction

The photograph of Harrison Young and Maj. Gen. Albert Genetti, Jr. on page 16 of the June *Engineer Update* was taken by F.T. Eyre.

## Baseball field

During ENFORCE XXI, the Corps dedicated a baseball complex to the memory of Col. Robert Morris, former Kansas City District Engineer.

More than 200 people were present as Lt. Gen. Joe Ballard, Chief of Engineers, and Morris' widow, Linda, unveiled a bronze plaque bearing Morris' likeness.

Morris served the Corps and the Army for 24 years. He retired from active duty in January 1998, and died of cancer in May 1998.

"It has always seemed to me that the truest recognition comes from the hearts of friends and colleagues," said Ballard. "By dedicating this baseball complex to Bob Morris, we are recognizing his spirit of competition, his zest for life, and his service to the nation."

## Construction Management Excellence Award

Tom O'Bryan, Chief of Construction for the Grand

Haven Area Office (GHAO) in Detroit District, has received the Corps' Construction Management Excellence Award for his work with contractors on the Eastern Shore of Lake Michigan.

Last year, the GHAO Construction Section executed about \$13 million of construction involving 10 contracts at 13 different harbors along 300 miles of shoreline. O'Bryan managed these projects with five construction personnel, three survey personnel, and one maintenance technician. All major projects were formally partnered and executed with no litigation.

## Patents

Several employees of the Engineer Research and Development Center have been granted patents for their work.

Dr. James Leech, a supervisory research hydraulic engineer in the Coastal and Hydraulics Laboratory, received a patent for Interlocking Blocks for Stream Erosion Control. The concrete blocks are used to stabilize stream-banks, coastlines, roadbed embankments, and boat ramps. Connections between adjacent blocks are made by radial projecting members and recesses on the outer edge of each block.

Dr. Phil Malone, a research geologist, and Joe Tom, a civil engineer, both in the Structures Laboratory, received a patent for Shock Absorbing Block. The block is built from scrap rubber tires placed in a cellular concrete matrix. They form a shock absorbing block for use as bullet traps on firing ranges and traffic control situations shock absorbers.

Jeff Melby and George Turk, engineers in the Coastal and Hydraulics Laboratory, received several foreign patents for Core-Loc, an innovative coastal protection armor unit. Core-Locs are huge concrete "jackrocks" placed along coastlines to protect beaches from erosion. The engineers now hold patents for Core-Loc in Japan, Taiwan, Madagascar, Australia, New Zealand, Mexico, and Canada.

# Initiative preserves historic U.S. rivers

By Kathy Rea  
Huntington District

Some American rivers are more than just a lot of water flowing downhill. They are part of the nation's history. To help preserve these historic rivers, President Clinton announced the American Heritage Rivers Initiative during his State of the Union address in February 1997.

U.S. Army Corps of Engineers people are involved in this initiative. For example, the New River Community Partners (NRCP) have selected Ben Borda of Planning Division in Huntington District as the River Navigator for the New River.

As River Navigator, Borda serves as a liaison between the community and the appropriate federal programs to help the community get the assistance of state and local governments and the private sector. He provides information services, technical advice, and performs other duties at the community's request.

"I see my role as being more than just streamlining access to federal funding," Borda said. "I also envision working with groups to brainstorm creative ways to accomplish their goals and develop strategies which use a variety of public and private resources." He says this is a learning experience for both sides and sees himself as a partner working hand-in-hand with groups helping their plans become a reality.

AHR designation means that organizations and communities in the New River watershed will receive streamlined access to federal resources to carry out economic revitalization, natural resource and

water quality protection, historic and cultural preservation, and education and training. While organizations and communities still need to apply for existing funds through existing federal programs, New River's AHR designation will help these proposals take priority.

An interagency committee assigns federal agencies to provide River Navigators for each of the 14 rivers selected as AHRs. The Corps will designate navigators for two AHR, the Upper Mississippi and the New River. Two other AHR lie within Great Lakes and Ohio River Division, the Detroit River and the Cuyahoga River, but their River Navigators will be selected from other federal agencies.

"I'm proud to represent the New River Community Partners and the Huntington District," said Borda. The other Corps River Navigator for the Upper Mississippi River is Owen Dutt of St. Louis District.

The NRCP was organized to develop and oversee the planning process for the New River watershed, which is divided into three regions (the headwaters, the Middle New River, and the Lower New River) for planning purposes. The watershed plan, when complete, will include local, regional, and watershed-level projects.

Borda's selection stems largely from his interest in natural resources and environmental planning, plus his involvement with the NRCP. "I've enjoyed working with those in the New River watershed involved with the New River Community Partners."

Borda has been temporarily reassigned to this new post for one to five years, but he will continue to operate from the Huntington District office.



Mike Borda of Huntington District is the River Navigator for New River under the American Heritage Rivers Initiative. Navigators help communities access local and state government programs to develop and preserve their rivers. (Photo courtesy of Huntington District)

# 'Snake Lady' introduces kids, reptiles

By Leslie Criss

Her naturalist grandfather, supportive parents, and an alligator named Sam formed the framework of Dena Dickerson's future as a biologist and herpetologist with the Waterways Experiment Station (WES).

On Valentine's Day when she was 4, Dickerson's grandfather gave her a giant, heart-shaped box. The candy was missing, but inside was a baby alligator that became a part of the family and a fixture inside and outside the home until Dickerson was a fifth-grader and Sam was nearly four feet long.

By then Dickerson had a brother, and her parents weren't convinced a crawling baby and an alligator could co-exist peacefully. "We donated Sam to a wildlife refuge in Arkansas," said Dickerson.

Life with Sam contributed to Dickerson's growing curiosity about the environment. Today she speaks with knowledgeable ease of the value of kudzu ("The nutritional value is so high, we probably should be eating the stuff."), the life span of box turtles ("They can live for at least 100 years. I've run out in front of many a truck to save them.") and fatal snakebite statistics ("There are two to five deaths in the entire nation annually due to snake bites, and they're usually a result of the method of treatment.")

The biologist/herpetologist has been on board at WES since 1982. Labels aside, Dickerson is content being simply "the Snake Lady."

Some of her work involves traveling abroad when problems or protection issues arise with endangered species of reptiles and amphibians. She's worked with sea turtles, manatees, whales, crocodiles and, of course, snakes.

She recently returned from a month in Guam in the South Pacific, where the brown tree snake, "a non-descript, skinny, mildly poisonous, brown snake has been wreaking environmental havoc."

The snakes, originally from Australia and New Guinea, made their way to Guam at the end of World War II via military cargo. "They've eaten the birds, lizards, and bats of the island, so there's been a population explosion of spiders and insects," Dickerson said. "Biological scientists have been working with engineers to construct barriers to keep snakes from moving to other islands by cargo ships or airplanes. They're quite devastating to primitive, pristine islands."

Others are attempting to control the snakes in small areas of Guam so birds and lizards can reestablish their habitats. "Because there are so many, killing the snakes has not been extremely successful," she said.

Dickerson is a graduate of Mississippi College with bachelor's and master's degrees in biology, and in May 2000 she should finish her doctorate in conservation biology from the University of Southern Mississippi. She taught biology at Clinton High School for four years and confesses that teaching is her first love.



Dena Dickerson inspects a brown tree snake on Guam. (Photo courtesy of *The Vicksburg Post*.)

Thanks to the public outreach programs at WES, the self-professed nature-nut continues to visit classrooms from kindergarten to college to talk about snakes. She speaks to utility company workers whose jobs take them into the weeds. She's even worked with groups of people who have true snake phobias. And she gets calls from all kinds of people who want her to retrieve and relocate snakes that are in their trees, gardens, yards, and houses.

Some calls border on the comical. "I had a call from a man who had moved into a house in an exclusive neighborhood in North Jackson," Dickerson said, smiling. "He was frantic to get rid of a snake that was in the rafters of his attic. He met me in his driveway with a gun. He'd been pulling down his attic door and shooting into his attic, never hitting the snake. He'd done thousands of dollars of damage to his roof for a completely harmless chicken snake."

Dickerson calmly retrieved the snake, which she happily relocated in

her barn.

"Whether spurred by fascination or fear, the general public has an inherent interest in snakes," Dickerson said. "But people have been brought up with a lot of misconceptions about snakes."

It's her pleasure to educate the public on the real truth about the creatures.

"Snakes are the garbage disposals of the environment," she said. "If we decrease our snake population, we'll have other major problems with rats and mice, among other definite problems."

She knows of no documented case of fatality from a snakebite in Mississippi and blames antiquated ways of treating a snakebite with most of the health problems.

"People seem to think the correct way to deal with a bite is to cut the wound and suck out the venom," Dickerson said. "Don't! That's only introducing more bacteria. The best bet is to treat the bite like a bad cut, perhaps accompanied by some antibiotics."

A frantic and fearful father, whose 5-year-old was bitten on the ankle by a

snake, used his pocketknife to cut her ankle and get out the venom, Dickerson said. The girl ended up with infection and tissue damage from the bite of a non-poisonous chicken snake. "The father did more damage than any of our snakes would have done."

Most times, "up to 90 percent," snakes bite only when someone is trying to kill them, Dickerson said. "Like anything, when threatened, they will attempt to protect themselves."

Glenn Rhett, a biologist at WES who works with wetlands, is a firm believer in Dickerson's snake savvy. "I still remember the first time someone told me that Dena Dickerson would be the one to ask about a snake identification," he said. "My first thought was, 'That's a bit unusual, for a lady to be an authority on snakes.' But she is."

Rhett said Dickerson has, on many occasions, come to the rescue when he's found snakes around his house. "I asked my 9-year-old once what he thought of the Snake Lady, and his response was simple — 'She's brave.'"

Rhett said he would encourage anyone to take advantage of Dickerson's snake class. "It's interesting and informative," he said. "But more than anything else, she dispels the notion that all snakes are poisonous and should be killed on sight. And she's great with kids. The real highlight at the end of one class with kids was when she let them come up and hold a 10-foot constrictor around their neck for photographs."

Sharing the office with Dickerson are Bongo, a Columbian boa constrictor, and Zorro and Ariel, two iguanas. On the home front, a farm shared with her husband, Jan Hoover, a fish biologist at WES, there are more pets, both domestic and exotic.

The two have created a scientific haven for neighborhood children — three horses, six dogs, two cats, an assortment of snakes, lizards and Tarzan and Zilla, two orphaned iguanas. There's even a pond.

"Our place is like a magnet for kids," Dickerson said. There's an entire room devoted to children's science books, and the kitchen "is frequently turned into a giant lab. I bought some microscopes to have at the house. The kids use dip nets to get stuff from the pond. We've looked at all kinds of things — lizard eggs, spider eyes, you name it."

Giving other young people the same gift her parents gave her, the freedom to explore natural curiosities, Dickerson hopes to change perceptions about snakes and maybe train up a biologist or two.

"Many school-age children are growing up to know snakes are not bad, that they are a positive aspect of our environment," Dickerson said. "I do what I do now because I learned that early on and, in part, my parents' allowing me to have unusual pets developed into a career as a professional biologist."

(Leslie Criss is a reporter for "The Vicksburg Post" in Vicksburg, Miss. This article appeared in "The Vicksburg Post" on May 2.)